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Versar INC.

January 21, 2000

Mr. David Hung, P.E.
Associate Water Resource Control Engineer
Los Angeles Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, California 90013

Subject: Response to Comments, dated January 5, 2000, on the Master Work Plan, Cenco Refining Company (formerly Powerine Oil Company), Santa Fe Springs, California.

Dear Mr. Hung:

The purpose of this letter is to respond to comments on the June 1998 version of the Master Work Plan provided by the City of Santa Fe Springs Fire Department (SFSFD) in their letter dated January 5, 2000. In August 1998, the CENCO Refining Company (CENCO) purchased the assets and liabilities of the former Powerine Oil Company (Powerine), including the refinery and adjacent properties in Santa Fe Springs, California. CENCO plans to operate the refinery once facility improvements have been completed. CENCO is revising the Master Work Plan based on continued operation as a refinery. The Revised Master Work Plan will incorporate comments from the California Regional Water Quality Control Board (RWQCB), Los Angeles Region, in correspondence dated October 27, 1999, and as appropriate, comments from the SFSFD.

Comment:

The assessment should include all volatile organic compounds (VOCs) including HVOCs and MTBE, semi-volatile organic compounds (SVOCs) including polyaromatic hydrocarbons (PAHs), metals and inorganics such as cyanide, speciated organic lead, as well as petroleum hydrocarbon (PHC) chain speciation through C40. Other parameters such as redox should be measured as well in the interest of fate and transport estimations.

Response:

The investigations performed at the CENCO refinery and associated properties have included soil and groundwater sampling and analysis for VOCs, halogenated volatile organic compounds(HVOCs), methyl tertiary butyl ether (MTBE), PAHs, metals, and total petroleum hydrocarbons as gasoline and diesel (TPH-g and TPH-d) and total recoverable petroleum hydrocarbons (TRPH). TPH-g analysis measures gasoline-range petroleum hydrocarbons (C_6 through C_{12}), TPH-d measures diesel-range petroleum hydrocarbons (C_8 through C_{17}), and TRPH measures C_7 through C_{40}. CENCO routinely measures fate and transport parameters such as

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redox, dissolved oxygen, and nitrate concentrations during semi-annual groundwater monitoring, and has collected total organic carbon, bulk density, and other fate and transport parameter information during soil investigations.

The results of soil investigations performed at the CENCO refinery and at the former Lakeland, Bloomfield, and Walker properties indicate that limited areas have been impacted by petroleum hydrocarbons and associated constituents. A widespread and significant impact to surface and near surface soil (0 to 5 feet below ground surface [bgs]) has not been found at the CENCO refinery during 15 years of environmental investigation and assessment.

Comment:

The SFSFD suggests that soil sampling should be done when replacing MWs.

Response:

As reported in the *Semi-Annual Groundwater Monitoring Report*, dated September 1999 (Versar 1999a), groundwater monitoring wells MW-104A, MW-600A, and MW-601A were installed as replacement wells for MW-104, MW-600, and MW-601. Soil samples were collected at 10-foot intervals in each boring, in accordance with the *Addendum to Master Work Plan for Monitoring Well Installation and Abandonment Activities*, dated May 17, 1999 (Versar, 1999b), and approved by the RWQCB.

Comment:

The SFSFD is aware that the site is in a hydrogeologically sensitive area. Lower aquifers can b hydraulically connected to shallow groundwater in this area. Studies such as radiocarbon dating of groundwater could shed light on the likelihood of lower aquifer risk from PHCs and other possible site contamination.

we need newer data

Response:

In 1985, IT Corporation (IT) collected considerable geochemical data from groundwater sample collected from the Exposition Aquifer and from deep production wells. These data will be used as part of the fate and transport analysis to distinguish between aquifers using Stiff diagrams an other geochemical plots. This analysis will be included in the feasibility study to be prepared fc the CENCO Site.

First-encountered groundwater occurs beneath the CENCO Site at about 85 feet bgs in the Bellflower Aquitard. The Exposition Aquifer, which underlies the Bellflower Aquitard, is not

used for potable supply. The Exposition Aquifer extends to about 150 feet bgs and is immediately underlain by an un-named aquitard, which is in turn underlain by the Hollydale Aquifer. The Hollydale Aquifer extends to 275 to between 315 feet bgs and is not used for potable supply (HLA, 19995). Underlying the Hollydale Aquifer is an un-named aquitard, which in turn is underlain by the Jefferson Aquifer. The Jefferson Aquifer occurs at depths greater than 400 feet bgs and is the shallowest aquifer used for potable supply in the Santa Fe Springs area. It is unlikely that petroleum hydrocarbons which are less dense than water will impact the deeper aquifers zones beneath the CENCO Site.

There are three groundwater production wells located on the CENCO refinery property at 12345 Lakeland Road. The wells are screened beneath the first-encountered groundwater at the Site, with screened intervals located between 450 and 690 feet bgs. These wells are likely screened within the Jefferson Aquifer. Groundwater from the wells was analyzed in 1986 for total fuel hydrocarbons and purgeable priority pollutants; no concentrations of analytes were detected (IT, 1986). Well 7 was sampled for HVOCs (EPA Method 8240) and petroleum hydrocarbons as jet fuel, kerosene, diesel and gasoline fuels (EPA Method 8015 modified) in 1993. None of the analytes were detected. All three wells were analyzed for HVOCs and petroleum hydrocarbons (EPA Methods 8260 and 8015, respectively) in 1997, toluene was detected in Well 6 on the former Lakeland Property at a trace concentration of 0.88 micrograms per liter (μg/L).

Comment:

The SFSFD agrees that the ASTM Risk Assessment for PHCs, as well as other approaches such as the Total Petroleum Hydrocarbon Criteria Working Group approach have merit. However, these are not regulatory approaches and the SFSFD is not obliged to accept conclusions for regulatory review based on these approaches. The SFSFD refers to the EPA Risk Assessment Guidance for Superfund (RAGS), the Cal EPA Preliminary Endangerment Assessment (PEA) and refers to the EPA Region IX Remediation Goals (PRGs) as well as RWQCB Interim Guidance in regulatory review.

Some of the assumptions made for the preparation of this work plan as well as a RBCA document seem to be based on relatively old data, such as sampling performed by IT in 1985. This data is incomplete for regulatory review as stated above.

The SFSFD concludes that further assessment is needed, including a Health Risk Assessment and Fate and Transport Analysis. This assessment should be based on new data, identify sensitive receptors, and include surficial soils, the vadose zone, and groundwater data to quantify the Health Risk Assessment and Fate and Transport Analysis. This is to enable accurate long-term risk evaluation assessment from all media at this site by all involved agencies including the SFSFD, based on current data and methodologies.

Response:

The approach to evaluating the potential for impacted soil to pose a risk to human health will be presented in the Human Health Risk Assessment Work Plan, which will be included as an appendix to the Revised Master Work Plan. As stated in the work plan, the human health risk assessment will be based on use of the Site as an active refinery. The assessment will utilize the American Society for Testing and Materials (ASTM) Risk-based Corrective Action approach, which is based on the U.S. EPA's RAGS document, but is more conservative. The assessment will incorporate California and regionally-specific parameters and Site-specific data in evaluating and quantifying risk to Site and surrounding sensitive receptors.

Information regarding subsurface conditions reported by IT (1986) has been supplemented by investigations performed by HLA (1995 & 1997), TriHydro (1996 &1997), TRC Environmental Consultants, Inc. (TRC, 1990), and Versar (1998-1999). Subsequent investigations have focused on areas identified in the 1986 IT report as requiring further characterization. Therefore, we consider the recommendations made in the Master Work Plan to be based on current and sufficient data.

Comment:

Versar also refers to several MWs that should be replaced to accurately gauge PHCs in groundwater (GW). We suggest that MWs 103 and 603 be replaced as well for the same reason. The Versar report suggests that the current GW gradient is south southwest. We suggest that it is south southeast, based on these data as well as data from adjacent sites. Versar suggests using only one MW for testing. However, parameters such as transmissivity conductivity (sic) may vary greatly. The data shows two orders of magnitude difference in GW transmissivity at the site. Also, we suggest GW sampling through the GW interval as well as the GW surface.

Response:

Historical depth to groundwater measurements indicate that the depth to groundwater is within the screened interval of monitoring wells MW-103 and MW-603. Free-phase petroleum hydrocarbons have been observed in only one of these wells (MW-103) in 1994 at a thickness of 0.001 feet. Free-phase petroleum hydrocarbons have not been observed in Well 103 since 1994. The occurrence of free-phase PHCs in these wells consists of three measurements of 0.001 foot thickness in MW-103 in 1994. Installation of replacement wells is not warranted.

HLA (1995) found that the groundwater flow direction is consistently south-southwest in and around the Walker Property based on investigations performed by Aerovironment (9/92), Environmental Resolutions (7/90), HLA (1993), and TRC (1989). The IT (1986) investigation

of the Powerine area found groundwater flow to be to the south and south-southwest. TriHydro (1996) found flow to be to the south in December-January 1995/6. TriHydro (1997) measured groundwater flow at the Site to be to the south. Versar has performed semi-annual groundwater monitoring since January 1998, and found that the groundwater flow direction is consistently south to southwesterly. There does appear to be a local groundwater ridge within the area beneath the CENCO refinery resulting in a localized component of south-southeasterly flow in the east-central portion of the CENCO refinery. The Revised Master Work Plan (due January 31, 2000) will describe future aquifer testing activities.

Comment:

We find there is reason to suspect significant HVOC contamination in the vadose zone based on earlier data provided by IT, as well as other reports. For example, IT reported 26 mg.kg "total HVOCs" at 3.5' below ground surface (bgs) (boring 103), and 57 mg/kg at 13' bgs (MW-101). The sampling methods and tests are not stated. These data indicate historic on-site releases of HVOCs, which could contribute to groundwater contamination. The SFSFD notes that data indicates historic off-site migration of HVOCs including daughter products, but notes the apparent presence of TCE on the West Side of the site in the 30 ug/L range, indicating a more recent release. The SFSFD understands that HVOCs are commonly used in isomerization processes and may also appear in the impounding basin, sumps, wastewater system (specifically API separators) and around the chloride storage units. We therefore suggest soil borings and analysis for HVOCs be performed in these areas. The data also indicates the unusual presence of cyanide at a depth that could threaten groundwater and therefore we recommend this issue be examined further.

Response:

CENCO has conducted extensive research into the regional groundwater quality in the Santa Fe Springs area. Several sites have been identified as major contributors to the groundwater conditions in this area. The following sites have been identified during CENCO's research as having HVOC contamination plumes which extend off-site. These sites are located less than 0.7 miles directly upgradient from CENCO.

- The Angeles Chemical Company is located at 891 Sorenson Avenue in Santa Fe Springs, approximately 0.7 miles north (upgradient) of the CENCO Site. Groundwater at the Angeles Chemical Company site has been heavily impacted with a variety of HVOCs. Specific contaminants include acetone (191,000 µg/L), 1,1-DCA (3,880 µg/L), 1,2-DCA (1,140 µg/L), 1,1-DCE (6,500 µg/L), 1,1,1-trichloroethane (1,1,1-TCA) (189,000 µg/L), benzene (848 µg/L), TCE (14,300 µg/L), toluene (17,200 µg/L), xylenes (9,310 µg/L), and PCE (7,980 µg/L) (Harding Lawson Associates [HLA], 1996).

- The Ashland Chemical C
Santa Fe Springs, locate
CENCO Site. Site asses
indicate the presence of
Although groundwater r
HVOCs have migrated c
chemicals in groundwater detected in monitoring wells downgradient of the Ashland facility include TCE (120 μg/L), total 1,2-DCE (790 μg/L), 1,1-DCA (580 μg/L), 1,2-DCA (160 μg/L), vinyl chloride (730 μg/L) and benzene (67 μg/L) (GTI, 1995).

- The McKesson Chemical Company is located at 9005 Sorenson Avenue in Santa Fe Springs, approximately 0.7 miles north (upgradient) of the CENCO Site. Groundwater beneath the McKesson facility has been heavily impacted with VOCs released from the site and the adjacent Angeles Chemical Company site. Specific groundwater contaminants include: acetone (681,000 μg/L), 1,2-DCA (4,360 μg/L), cis-1,2-DCE (12,800 μg/L), 1,1-DCE (22,000 μg/L), 1,1,1-TCA (110,000 μg/L), 1,1-DCA (4,360 μg/L), PCE (45,000 μg/L), TCE (15,300 μg/L) and benzene (120 μg/L) (HLA, 1996).

- The Mobil Oil/Jalk Fee Lease consists of approximately 8.8 acres of currently undeveloped land located approximately 0.3 miles northwest of the CENCO Site. Groundwater contaminants at the Mobil Oil/Jalk Fee Lease site include long-chain petroleum hydrocarbons, PCE (1,100 μg/L) and TCE (88 μg/L) (Alton, 1997). PCE from the Mobil Oil site appears to have impacted groundwater in the western portions of the CENCO Site and the Metropolitan State Hospital. Groundwater beneath the Mobil Oil/ Jalk Fee site appears to have been impacted by contaminants from the adjacent Continental Heat and Treat Facility.

Investigations performed to date at CENCO have located no sources of HVOCs on Site, but further substantiate migration of HVOCs onto the CENCO property. Elevated levels of HVOCs have not been detected in vadose zone soil at the CENCO Site during numerous investigations focused on areas of potential HVOC use, such as west of the refinery laboratory (TriHydro, 1997). IT (1986) reported a level of 26 mg/kg of HVOCs in soil in Boring 103 and 57 mg/kg in Boring 101, based on Total Organic Halogen (TOX) analysis, which measures both volatile and non-volatile all halo-carbons including SVOCs and PCBs. Analysis of the same samples for VOCs using EPA Method 8240 indicated that HVOCs are not present in soil in Boring 103 and Boring 101. The Revised Master Work Plan will provide a more thorough discussion of these results and include sample analysis methods to facilitate regulatory agency review.
In subsequent investigations, HVOCs were not detected (EPA Method 8260) in soil adjacent to an impounding basin and clarifier in the North Coke Handling Area (TriHydro, 1997). HVOCs were also not detected (EPA Method 8010) in soil samples collected between 5 and 21 feet bgs, and in soil gas samples collected at the former wastewater storage tank area and in the former

chlorinated hydrocarbon storage and analytical laboratory areas (TriHydro, 1997) at the CENCO refinery.

GW @ 85' can't apply DAF of 20

Cyanide has never been associated with CENCO operations. The levels of of cyanide in soil (1.5 mg/kg and 0.2 mg/kg) at depths of 88.5 feet bgs in Boring 203, and 88.0 feet bgs in boring 104, respectively, are not actionable. The EPA Region IX PRG for cyanide in soil adjacent to a receptor well is 2.0 mg/kg with no attenuation for the protection of groundwater. Applying the EPA-recommended dilution attenuation factor (DAF) of 20 results in a PRG for cyanide of 40 mg/kg in soil for the protection of groundwater at these locations.

TCE and PCE are present in groundwater on the west side of the site. The presence of TCE and PCE, rather than their daughter products, does not necessarily indicate a recent release. HVOCs do not degrade readily in the subsurface, and in some environments (such as aerobic and sulfate-rich) PCE and TCE may persist unchanged for decades.

If you require additional information, please contact me at (510) 814-5942; or June Christman, Environmental Coordinator at CENCO, at (562) 944-6111.

Sincerely,

for Eliana Makhlouf, Ph.D., P.E.
Vice President, Pacific Region

cc: Ms. June Christman, Environmental Coordinator, CENCO Refining Company
Mr. Neal Welland, Fire Chief, City of Santa Fe Springs Headquarters Fire Station.
Mr. David Klunk, Director, of Environmental Services, City of Santa Fe Springs Headquarters Fire Station.